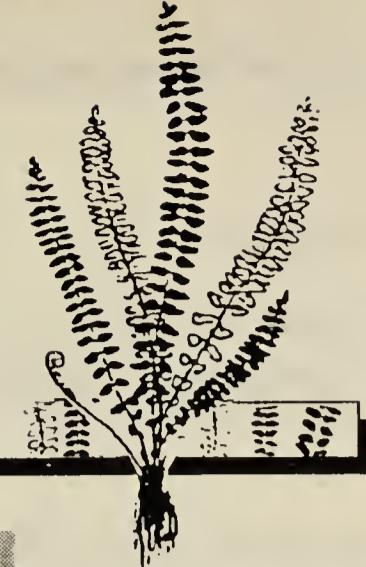
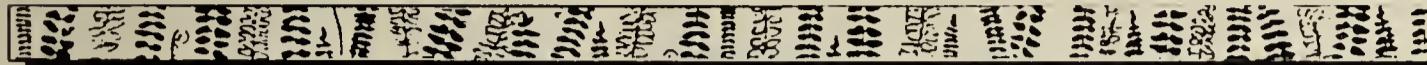


Hardy Fern Foundation

NEWSLETTER

Editor Sue Olsen ■ VOLUME 3 NUMBER 4 ■ FALL 1993



President's Message

GUY HUNTLEY

I for one am glad that fall has finally hit the fern border. Perhaps (though unlikely), I'll be able to slow down a little bit, take more time for contemplation; take more time for enjoyment of those things that I appreciate...

One thing I appreciated last summer was a hike to Perry Creek, in the Mount Baker National Forest here in Washington. Members of the HFF and their families met for an easy hike up one side of the canyon, through several different habitats. In all I think we saw 18 different ferns, among them *Adiantum aleuticum* (pedatum), *Asplenium trichomanes*, *Blechnum spicant*, *Cryptogramma crispa*, and several *Polystichum*s. There were numerous other botanical delights as well - and I must say that the company was superb!

I also appreciate the evaluations which members sent in of their fern gardens. One of our members - Herman Entz - is compiling the information onto a database for us; look for an article regarding these - and the evaluations from the Satellite gardens - with the January spore exchange list.

I sincerely hope that all of you have a great holiday season. If you can, take a cue from the ferns, and take time to rest a little.



L-R Steve Hootman,
Guy Huntley w/
Anneka Huntley,
Suzanne Hattery,
Bruce Winchell, w/
Beth Winchell,
Dave Hattery w/
Linnea Hattery,
Ben Winchell,
Michelle Panzer

(Photo by Sue Olsen)

Perry Creek

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OSMUNDA *cinnamomea* Cinnamon Fern

BY JAMES HORROCKS

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The Royal Fern Family, *Osmundaceae*, is a very ancient one, first appearing in late Paleozoic (Upper Permian) strata. Quoting from Thomas N. Taylor's "Paleobotany": "Most information about the fossil history of the family comes from structurally preserved stem segments, many of which have been reassigned to extant genera. ...Isolated osmundaceous sporangia and spores are common in Mesozoic rocks and are typically identical with extant forms. ...Although the fossil record of the *Osmundaceae* appears extensive, there are numerous gaps in our knowledge about the origin of the family and relationships among the taxa."

The genus name, *Osmunda*, is as shrouded in mystery as is the origin of the Royal Fern Family. It is first mentioned by the physician and herbalist Lobelius (1538-1616) and may possibly originate from the German after the germanic God of Thunder, Thor, whose nickname, interestingly enough, was Osmunda. There are several other stories of origin. Wherry claimed that it was derived from Osmunder, a Saxon mythological character. A romantic legend tells of one Osmund, a waterman of Loch Fyne in Scotland, who hid his wife and daughter in a stand of *Osmunda regalis* during a raid by the Danes. This story is, however, very unlikely. Whatever its origin, the name *Osmunda* was proposed by Linnaeus in

1753 as a means of classifying this interesting group of ferns. The true meaning of the word *Osmunda* is unknown.

The species name "cinnamomea" refers to the cinnamon-brown color of the spore-bearing fronds at maturity, often referred to as "cinnamon sticks". The sterile fronds are much taller, as much as 6 feet or so in length, and the entire plant is on a truly massive scale. It is found growing in acid swamps and bog margins. In North America it ranges from Newfoundland westward to Minnesota and south to central Florida across the southern states to New Mexico. Wherry mentions it from the West Indies. It is not native to western North America, the British Isles, or Europe but a variety of it, var.



Osmunda cinnamomea at the Rhododendron Species Botanical Garden
(Photo by Sue Olsen)

fokiensis, is known from the Asian continent, principally Japan, China, Korea, Manchuria and the Himalayas to Thailand. It has also been known as *Osmundastrum cinnamomeum* var. *fokiensis* and *Osmunda asiatica*.

The cinnamon fern may possibly be confused with *O. claytoniana*, the Interrupted Fern, especially if only sterile fronds are displayed in the latter. The Ostrich Fern, *Matteuccia struthiopteris*, might be mistaken for it, and interestingly enough the Ostrich Fern was originally classified as an *Osmunda* by Linnaeus, but the very distinct ostrich plume cut of the fronds with the abruptly narrowed tip is a feature which easily distinguishes the Ostrich fern from almost all other ferns resembling it, especially the Cinnamon fern.

Description: The creeping rhizome of the Cinnamon fern is very large, covered with a dense tangled growth of black fibrous roots and stipe bases which appear above the soil level and resembles, citing Herbert Durand, "a huge half-buried shoe-brush". The stipe is pinkish and as much as half the length of the blade. The fronds are strongly dimorphic, the first to appear being the fertile ones, which are stiffly erect and wand-like, twice-pinnate but without leafy tissue. The sporangia are relatively large and born openly in stalked complex clusters. The fertile fronds are shorter than their sterile counterparts and soon after dehiscence they wither and fall to the ground where they remain making for easy identification.

The sterile fronds appear very soon after the fertile but are slower growing. They can reach lengths of from 2 to 6 feet and in width from 5 to 10 inches. They are considered pinnate with pinnae deeply cut into somewhat scythe-shaped segments, ending in a blunt but distinct point. The blade outline is oblong-lanceolate. The fronds are deciduous.

The spore cases completely cover the contracted fertile pinnae, at first appearing bright green, then turning a cinnamon-brown in May. The spores are green and short-lived.

Culture: Wherry states: "It is desirable in a moist shady garden if this is on a large enough scale for such a massive plant." It has been said to be somewhat adaptable to ordinary gardens, but often proves short-lived if it does not receive the constant moisture and acidic conditions that are to its liking. In areas of relatively high humidity it can take full sun, but it probably is at its best with some shade. If you are fortunate enough to have a place that meets its requirements, *Osmunda cinnamomea* is an impressive fern for the background or for transitional plantings.

Another Cobble

Catherine W. Guiles, author of the article entitled "Bartholomew's Cobble and the Norcross Wildlife Sanctuary, Massachusetts," published in the summer '93 issue of the *HFF Newsletter*, reports that she recently learned, through The New York Times, of another natural cobble in Massachusetts.

This is the Tyringham Cobble, in the small western Massachusetts town of Tyringham, near Lenox. According to The Times this cobble is 400 ft. high (the highest elevation of Bartholomew's Cobble is 100 ft.). Like Bartholomew's Cobble, the Tyringham Cobble is also owned by the Trustees of Reservations. To reach it, visitors should take the Tyringham Rd, off Rt 20 in East Lee.

Given the geologic composition of the New England cobbles, it is likely that the limestone-loving ferns found at Bartholomew's Cobble might also be seen at this location. For further information, the mailing address for this cobble is 565 Sloan Rd. Williamstown, MA 01267. The telephone number is (413) 453-3144.

The Times article (Travel Section, July 4, 1993, p. 9) states that the "20-minute-long ramble up the blue-blazed Cobble Trail affords a lovely picnic sight... Views include the virtually undeveloped Tyringham Valley to the southeast, banked by rolling expanses of forested hills." Sounds like a nice place!

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The Fern Guide (1961) Edgar T. Wherry, Doubleday, New York

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MEMORIAL

Thomas D. Gillies of Olympia, Washington, died on August 13th, of heart failure. Tom served the Hardy Fern Foundation in the position of First Vice President, and had recently begun the laborious task of cataloging the collection of fern books which had been donated. Additionally, Tom oversaw the HFF's educational booth at the Northwest Flower and Garden Show; his effort - and success - were far beyond any expectations or requirements. Tom's insights, his hard work, and his humor will be sadly missed. We have lost a good friend.

Ferns in the Van Landingham Glen at UNC Charlotte

BY DR. LARRY MELLICHAMP

DIRECTOR, UNC CHARLOTTE BOTANICAL GARDENS
CHARLOTTE, NORTH CAROLINA

The Van Landingham Glen was founded on the young campus of the University of North Carolina at Charlotte in 1966 by biology professor (now emeritus) Dr. Herbert Hechenbleikner. His idea was to develop a seven acre garden of hybrid rhododendrons (a favorite plant of our benefactor, the late Ralph Van Landingham of Charlotte) within a setting of native plants found in the Carolinas - from the highest mountains down to the edge of the sea. Today we have over 3,000 hybrid rhododendrons specimens, representing probably 300 named varieties; all of the native rhododendrons and native azaleas of North America, and many European and Asian ones as well; and some 1,000 species of native trees, shrubs, wildflowers and ferns.

Ferns, and fern allies, were of particular interest to Dr. Heck (as we call him) and we have about 70 species, varieties and hybrids. It is a remarkably complete collection of those natives that are easy to cultivate. We do not have many of the rock-growing *Aspleniums*. Our collection contains some fairly rare types that appear to do well here in the Southeast, such as Wright's Cliff-brake (*Pellaea X wrightiana*). On the other hand, some of the species from the high mountains do not like our hot summer temperatures. They would be happier in gardens in the Northeast.

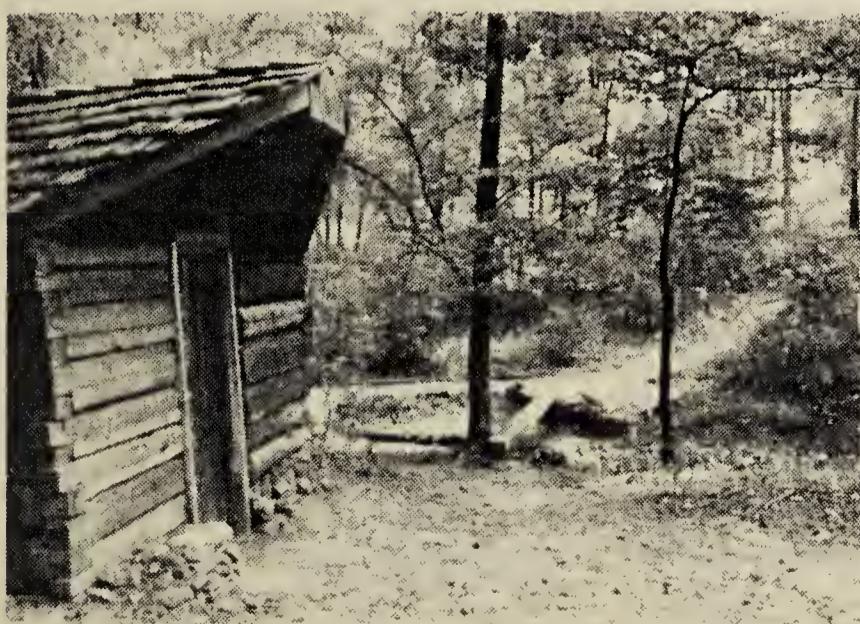
We are especially proud of our *Dryopteris* garden, which includes a duplicate of most of the species and many of the hybrids from the research collection of Dr. Herb Wagner of the University of Michigan's Matthaei Botanical Garden. This was the collection he put together and used for chromosome and morphological studies for his landmark investigation of the eastern North American *Dryopteris* complex published in 1970. We hope to maintain this planting, arranged in a pattern that places hybrids between parents, as a distinct section in the Glen. Because of the large number of species and the relative ease of cultivation, *Dryopteris* are a favorite group for cultivation. If I had to choose one favorite fern for attractiveness and ease of growth, it would be our Southern Hybrid Woodfern, *Dryopteris X australis*, often growing 4' tall and usually semi-evergreen.

We shall certainly continue to seek out, especially from known wild localities, those few species that we do not have from the Carolinas and make an effort to grow them. In some ways we are a test garden, though we do not purport to keep accurate records of successes and failures on a species-by-species case. Since we are growing natives of the Carolinas only - with the exception of members of the *Dryopteris* complex - there should be no question of their hardiness, only in their adaptability to conditions here in the Piedmont region. Our summer temperatures regularly range into the high 90's, with lows above 70°F in July and August (a situation not liked by northern plants!). In winter, daytime highs are above freezing (with very rare exceptions) making for usually mild winters. While normally we have temperatures that always get down into the teens several times during the winter, the past four winters have been unusually mild with temperatures never below 20°F. We are in the new USDA hardiness zone 7, which means our *theoretical* average minimum winter temperature is zero. Rainfall averages 45" per year, and is fairly evenly spread; but June through September can be quite warm and dry, even though we have numerous thunderstorms. We must be prepared to water regularly in the Glen, which we do using overhead sprinklers. I believe this accounts for the success of many ferns from outside this province.

We would definitely be eager to hear from anyone who has species, natural hybrids (especially *Dryopteris*) or wild forms available that would fit into our context.

The following is an alphabetical listing of the species of pteridophytes we have. Almost all of the specimens came from the wild, though we do not necessarily know exactly where for each. Nomenclature follows David B. Lellinger's 1985 book, *A Field Manual of the Ferns & fern-allies of the U.S. & Canada*.

<i>Adiantum capillis-veneris</i>	<i>Dryopteris ludoviciana</i>	<i>Lycopodium alopecuroides</i>
<i>Adiantum pedatum</i>	<i>Dryopteris marginalis</i>	<i>Lycopodium appressum</i>
<i>Asplenium platyneuron</i>	<i>Dry. campyloptera x marginalis</i>	<i>Lycopodium carolinianum</i>
<i>Asplenium rhizophyllum</i>	<i>Dry. celsa x cristata</i>	<i>Lycopodium dendroideum</i>
<i>Athyrium filix-femina</i> ssp. <i>asplenoides</i>	<i>Dry. celsa x goldiana</i>	<i>Lycopodium digitatum</i>
<i>Athyrium pycnocarpon</i>	<i>Dry. clintoniana x goldiana</i>	<i>Lycopodium lucidulum</i>
<i>Athyrium thelypteroides</i>	<i>Dry. clintoniana x cristata</i>	<i>Lycopodium obscurum</i>
<i>Botrychium biternatum</i>	<i>Dry. filix-mas x marginalis</i>	<i>Lygodium palmatum</i>
<i>Botrychium dissectum</i>	<i>Dry. intermedia x marginalis</i>	<i>Onoclea sensibilis</i>
<i>Botrychium virginianum</i>	<i>Dry. X australis (celta x ludoviciana)</i>	<i>Ophioglossum pycnostichum</i>
<i>Cheilanthes lanosa</i>	<i>Dry. X benedictii (carthusiana x clintoniana)</i>	<i>Osmunda cinnamomea</i>
<i>Cheilanthes tomentosa</i>	<i>Dry. X boottii (intermedia x cristata)</i>	<i>Osmunda claytoniana</i>
<i>Cystopteris bulbifera</i>	<i>Dry. X dowellii (intermedia x clintoniana)</i>	<i>Osmunda regalis var. spectabilis</i>
<i>Cystopteris protrusa</i>	<i>Dry. X separabilis intermedia x celta)</i>	<i>Pellaea atropurpurea</i>
<i>Cystopteris tennesseensis</i>	<i>Dry. X triploidea (intermedia X carthusiana)</i>	<i>Pellaea X wrightiana</i>
<i>Dennstaedtia punctilobula</i>	<i>Dry. X uliginosa (carthusiana x cristata)</i>	<i>Polypodium polypodioides</i>
<i>Dryopteris campyloptera</i>	<i>Equisetum arvense (invasive)</i>	<i>Polystichum acrostichoides</i>
<i>Dryopteris carthusiana</i>	<i>Equisetum hyemale var. affine (invasive)</i>	<i>Pteridum aquilinum</i>
<i>Dryopteris celsa</i>	<i>Isoetes engelmannii</i>	<i>Selaginella apoda</i>
<i>Dryopteris clintoniana</i>		<i>Thelypteris hexagonoptera</i>
<i>Dryopteris cristata</i>		<i>Thelypteris kunthii</i>
<i>Dryopteris filix-mas</i>		<i>Thelypteris noveboracensis</i>
<i>Dryopteris goldiana</i>		<i>Woodsia obtusa</i>
<i>Dryopteris intermedia</i>		<i>Woodwardia areolata</i>
		<i>Woodwardia virginica</i>



Van Landingham Glen

The Van Landingham Glen is part of the UNC Charlotte Botanical Garden, which also includes the Susie Harwood Ornamentals Garden and the McMillan Greenhouse and rain forest Conservatory. For further inquiries, descriptive brochures or information about our Gardens Associates Newsletter please write the Director, UNCC Botanical Gardens, Biology Department, University of North Carolina at Charlotte, Charlotte, NC 28223.

Shenandoah Ferns

JOAN E. GOTTLIEB

Shenandoah - an Indian word (perhaps meaning "Daughter of the Stars,") certainly a lyrical sound, is definitely a jewel in the crown of our National Park System. Established by Congress in 1935, it sits astride the crest of Virginia's Blue Ridge Mountains in the central Appalachians. The park is about 70 miles long, but quite narrow, ranging in width from less than a mile to about 13 miles. In 1930 President Hoover said, "...These mountains are made for a road..." and the next year work began on the 100 mile long Skyline Drive which meanders the full length of Shenandoah from Front Royal in the north to the Blue Ridge Parkway in the south. From its 75 scenic overlooks there are eye-popping vistas of mountain peaks, rolling forests and distant valleys with farmlands and settlements.

Some of North America's most ancient rock formations are found in Shenandoah, including hard, granite, basement rocks formed over a billion years ago (Old Rag and Pedlar Formations.) These are exposed today on the summit of Old Rag Mountain and at Marys Rock and Millers Head. A metamorphosed lava called greenstone covers the granite almost everywhere else and is the most common rock of the park (the gray-green Catoctin Formation.) It is over half a billion years old. These igneous rocks were permeated and even covered in places by a third group - sedimentary layers of sandstones, shales and conglomerates (the Chilhowee Formation.) which represent weathered sand and gravel carried by wind and water. Limestone was added starting about half a billion years ago

when the land was covered by shallow lagoons. These limestones are responsible for the many caverns found in the Shenandoah Valley.

All of these rock formations were upthrusted 250 million years ago when the African and North American continents converged in a slow, vise-like compression leading to the temporary super-continent Pangea. The resulting Appalachians were towering, craggy giants, as imposing as the Himalayas of today. But subsequent erosion removed over five vertical miles of rock, and Shenandoah now has a tame look of rolling hills and low peaks with densely vegetated flanks, punctuated by mountain streams and waterfalls. The words gentle and soothing, rather than gigantic and spectacular apply.

Since most of the exposed or near-surface igneous rock is acidic or neutral in nature, limestone ferns are generally rare or absent, but most of the acid tolerant, low montane and woodland species of the area are abundant. In a few spots (e.g. Big Meadows and Bear Wallow) some swamp and wetland species find suitable niches as well.

An excellent base camp for fern-finding is the Big Meadows area at Mile Post (M.P.) 51. It has all the amenities needed to satisfy a pteridomaniac's post-foray ferntasies - including hot showers and an excellent dining room at the rustic lodge (but fiddleheads are not on the menu.) From here in the middle of the park's Central District (M.P. 31.5 - 65.5) one can easily travel or hike to sites yielding 90% of the 44 species (plus varieties, forms and one sterile hybrid) of ferns and fern allies recorded in Shenandoah.



**SHENANDOAH
NATIONAL PARK**

The large, open meadow for which the area is aptly named, illustrates the recycled nature of the park. Prior to 1930 the land was private property - mostly small, subsistence farms supporting about 2,000 mountain people who stripped its timber, mined its surface minerals and attempted to farm its poor, rocky soils. After the blight of the early 1900's decimated the valuable chestnut trees, the ruined land was purchased parcel by parcel by the people of Virginia and presented as a gift to the nation. Since then, the long succession toward forest (currently at the intermediate stage) has taken place, except at Big Meadows, a 150 acre site of an old Indian camp, kept open by periodic moving and controlled burning.

In the meadow there are stands of *Osmunda claytoniana* and *Pteridium aquilinum* var. *latiusculum*. *Diphysastra* (*Lycopodium*) *digitatum* and *Lycopodium obscurum* are also present. But most notable is the abundance of *Botrychium multifidum*. One cannot stroll along any of the meadow paths in late summer without seeing the yellow fertile spikes of these grapeferns pushing up above the surrounding grasses and herbs. The ferns are probably even more abundant than one realizes, because the booming population of Virginia Whitetail Deer relishes the oil-rich spores of the *Botrychiums*, making the remaining, green, sterile frond segments very hard to spot.

From the Big Meadows campground, an easy walk along the Swamp Trail turns up the bulk of the damp soil requiring ferns. Two additional species of *Osmunda* - *O. cinnamomea* and *O. regalis* - are occasional here, as are *Dryopteris carthusiana*, *Thelypteris palustris* and *Isoetes virginica*. The latter grows in or near the headwaters

of the Rose River in Big Meadows Swamp and is an impressively large species. This unusual, wet mountain habitat also supports eye-catching stands of Blueflag Iris and Marsh Marigold in the spring, and Cardinal Flower and Canadian Burnet in summer. At the far end of Big Meadows Lodge a short woodland trail to Blackrock offers drifts of pale green Woodland Oak Fern (*Gymnocarpium dryopteris*) in humusy soil.

Behind the amphitheater a trail to Lewis Falls passes an impressive rock outcrop replete with *Woodsia ilvensis* and *Asplenium trichomanes*. Other ferns which abound along this trail include *Asplenium platyneuron*, *Polystichum acrostichoides*, *Dryopteris marginalis* and *D. intermedia*. The last three are common species of shaded woods throughout Shenandoah. Along the Skyline Drive and the many fire roads which branch from it one can spot *Dennstaedtiapunctilobula* and *Equisetum arvense* without leaving a moving vehicle.

A bit south of Big Meadows, at Milam Gap (M.P. 52.8) there is a loop trail to Hoover Camp - President Hoover's fishing retreat. Here are preserved several historically important buildings where foreign guests (such as England's Prime Minister Ramsey MacDonald) came to discuss world affairs. In the spring this is an outstanding area for native orchids (at least six different species.) It is also the only known park site for Rosebay (*Rhododendron maximum*) which blooms in early summer. Going down to the Camp, the trail parallels Mill Prong Creek. Here, the Northern Lady Fern, *Athyrium filix-femina* var. *angustum* and its red stipe forma *rubellum* are common along with *Thelypteris noveboracensis*, *Onoclea sensibilis* and *Adiantum pedatum*. Returning from Hoover Camp via the

Laurel Prong Creek Trail there are small populations of Daisy-Leaf Grapefern, *Botrychium matricariifolium* in June and July.

A little farther south along Skyline Drive, at M.P. 56.4 a section of the Appalachian Trail (A.T.) goes south from Bearfence Mountain. The trail enters an unusual heath barren just past the last turnoff to the Bearfence rock scramble (a worthwhile and scenic adventure.) Here *Lycopodium clavatum* and *Diphysastra* (*Lycopodium*) *tristachyum* grow in the dry rocky soil under Mountain Laurel and Pinkster Azalea. Elegant clumps of the semi-parasitic Virginia Oakleech (*Aureolaria virginica*) with yellow, trumpet-shaped flower spikes bloom here in July. The trail soon crosses a fire road and approaches Lewis Mountain camp-ground. *Botrychium virginianum* and *Phegopteris hexagonoptera* are frequent in the rich, damp woodlands along this section. In similar wet woods of the park occasional clumps of Goldie's Fern, *Dryopteris goldiana* can be found. This impressively large, leathery species has sori near the pinnule midveins, and is thus distinguished from the closely related, somewhat smaller, *Dryopteris marginalis*, whose sori are arranged along the pinnule margins.

Reversing direction and going north from Big Meadows, a stop at Fishers Gap (M.P. 49.4) offers an opportunity to see *Woodsia obtusa* on shaded rocks along the west side of Skyline Drive. A hike from here to Rose River Falls yields esthetically perched clumps of *Polypodium virginianum* as well as *Cystopteris fragilis*.

Still farther north at M.P. 45.6 is Hawksbill Gap. Here is one of the most beautiful sections of the A.T. and the avid fern seeker can find

Athyrium thelypteroides among a rich assortment of more common moist woodland species. The trail crosses a series of spectacular talus slopes punctuated by wild rock gardens capped with colorful lichens and succulent Allegany Stonecrop (*Sedum telephiooides*.) A left fork then leads to the summit of Hawksbill Mountain, the highest peak in the park at 4,049'. Near the top, open, north-facing rocks are home to large clumps of the park's most fascinating fern ally - a hybrid lycopod *Huperzia appalachiana X lucidula*. The plants can be found in humusy pockets on bare rock ledges or nestled under wind-dwarfed Mountain Ash, Balsam Fir and other woody species. The *Huperzia appalachiana* parent is no longer found in Shenandoah. *H. lucidula*, the other parent, grows in a few damp, wooded areas of the park, but not on Hawksbill. However, the abortive-spored hybrid thrives in the post-glacial conditions here and also on Stony Man Mountain a little farther north. It reproduces vegetatively through abundant gemma formation and is a botanical testament to the geologic and climatic changes that shape the Blue Ridge. There have been several attempts (one as recent as 1991) to re-introduce the Peregrine Falcon to Hawksbill - an interesting project for the hiker to observe from a non-intrusive distance. Don't miss the abundance of *Selaginella rupestris* on the flat rocks at Hawksbill's summit. It is not common in the park.

Pushing still farther north along the Drive at M.P. 41.7 one comes to Skyland, the first resort development in Shenandoah. The trail to Millers Head from here yields another rare opportunity to see *Woodsia ilvensis* and *Selaginella rupestris*. Both are well-adapted to the north-west facing granite and greenstone rocks at trail's end. An additional reward is

the incomparable view from here of Hawksbill and surrounding peaks and hollows. The area is a popular hang-glider launch site and numerous hawks ride the thermals off these rocks as well.

While in the Skyland area, take the Nature Trail up to Stony Man Mountain and carefully climb a few feet down the north-facing summit rocks to get a second look at *Huperzia appalachiana X lucidula*. The clumps here are smaller than on Hawksbill, but there are lots of young colonies recently started from gemmae. About five years ago the writer found *Huperzia lucidula* growing under some low shrubs near the summit, but recent visits failed to rediscover it. On the way down, a left turn onto the A.T. circles Stony Man along its northern flank, first passing Little Stony Man Cliffs (with imposing views) and then descending along the steep slope below the cliffs, a popular place for rock climbers and rappellers. Here, on overhanging rocks that drip in wet weather, are clumps of *Asplenium montanum*.

Thus, in a north-south distance of about 15 miles in the park's Central District, the majority of Shenandoah's pteridophytes can be found. However, a few species rare to the area can only be ferreted out if one travels farther north or south and is willing to descend to much lower elevations. For example, *Asplenium bradleyi* (the fertile hybrid between *A. platyneuron* and *A. montanum*) is known only from acidic rocks along Two Mile Run at M.P. 76.2. Similarly, *Aspleniosorus pinnatifidus* (a fertile hybrid of *Asplenium montanum* and *Camptosorus rhizophyllus*) is recorded only at rocky areas along the North Fork of the Moormans River (M.P. 92,) both locations at the southern extreme of the park. *Camptosorus*

rhizophyllus and *Asplenium resiliens*, both calciphiles, have been found in these same areas on damp, limestone outcrops along low-elevation streams. The Southern Lady Fern, *Athyrium filix-femina* var. *asplenoides* also grows in damp woods here at the southern end of the park.

Cheilanthes lanosa occupies dry, acidic rocks near Gooney Run Overlook (M.P. 7.3) near the park's northern entrance, where it survives as a resurrection species. Two rare grapeferns have been sighted in past years by botanists - Blunt Lobed Grapefern, *Botrychium oneidense* (damp woods,) and Triangle Grapefern, *B. lanceolatum* (rich woods.)

It is significant that in this one national park of about 300 square miles nearly twelve percent of North America's pteridoflora species are preserved and protected. But whether for its fabulous ferns, flaming fall foliage, vibrant flowers, abundant wild animals, inspiring views or impressive geology, a visit to Shenandoah is an unforgettable, and, like the park itself, a "refernishing" experience. Go and enjoy!

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1992 Ferns and Fern Allies of Shenandoah National Park

Adiantum pedatum	Botrychium oneidense	Isoetes virginica
Northern Maidenhair	Blunt-Lobed Grape-Fern	Virginia Quillwort
Asplenium bradleyi , Bradley's Spleenwort	Botrychium virginianum	Lycopodium clavatum
<i>A. platyneuron X A. montanum</i>	Rattlesnake Fern	Ground Pine
Asplenium montanum	Camptosorus rhizophyllus	Lycopodium obscurum
Mountain Spleenwort	Walking Fern	Tree Clubmoss
Asplenium platyneuron	Cheilanthes lanosa	Onoclea sensibilis
Ebony Spleenwort	Hairy Lip-Fern	Sensitive Fern
Asplenium resiliens	Cystopteris fragilis	Osmunda cinnamomea
Black-Stemmed Spleenwort	Fragile Fern	Cinnamon Fern
Asplenium trichomanes	Dennstaedtia punctilobula	Osmunda claytoniana
Maidenhair Spleenwort	Hay-Scented Fern	Interrupted Fern
Asplenosorus pinnatifidus	Diphasiastrum (Lycopodium) digitatum	Osmunda regalis
Lobed Spleenwort	Running Cedar	Royal Fern
<i>A. montanum X camptosorus rhizophyllus</i>	Diphasiastrum (Lycopodium) tristachyum	Phegopteris hexagonoptera
Athyrium filix-femina var. <i>angustum</i>	Ground Cedar	Broad Beech-Fern
<i>ibid</i> forma rubellum	Dryopteris carthusiana	Polypodium virginianum
Lady Fern, northeastern variety	Spinulose Wood-Fern	Rock Polypody'
Athyrium filix-femina var. <i>aspleniooides</i>	Dryopteris goldiana	Polystichum acrostichoides
Lady Fern, southeastern variety	Goldie's Wood-Fern	Christmas Fern
Athyrium thelypteroides	Dryopteris intermedia	Pteridium aquilinum var. <i>latiusculum</i>
Silvery Glade Fern	Glandular Wood-Fern	Bracken Fern
Botrychium dissectum <i>forma dissectum</i>	Dryopteris marginalis	Selaginella rupestris
<i>ibid.</i> forma obliquum	Marginal Shield-Fern	Rock Spikemoss
Dissected Grape-Fern	Equisetum arvense	Thelypteris noveboracensis
Botrychium lanceolatum var. <i>angustisegmentum</i> ,	Field Horsetail	New York Fern
Lance-leaved Grape-Fern	Gymnocarpium dryopteris	Thelypteris palustris
Botrychium matricariifolium	Oak Fern	Marsh Fern
Daisy-leaved Grape-Fern	*Huperzia appalachiana X <i>lucidula</i>	Woodsia ilvensis
Botrychium multifidum	Sterile hybrid of Appalachian and Shining Clubmosses	Rusty Woodsia
Leathery Grape-Fern	Huperzia lucidula	Woodsia obtusa
	Shining Clubmoss	Blunt-Lobed Woodsia

* Not considered as a separate species

Polypodium Paradise

One of the highlights of the BPS Centenary field trip was a visit to the garden of Hazel and Martin Rickard at The Old Rectory, Leinthall Starkes. Their garden displays over 900 species, varieties and cultivars of British and exotic ferns and they hold the National Council for the Conservation of Plants and Gardens (NCCPG) national collection of polypodiums (as well as Cystopteris and Thelypteridaceae). Martin has long specialized in the polypodiums (see box) and for the past 15 years has been trying to sort out the many cultivars. The following descriptions are the result of this research. Hazel has been propagating many of the forms for her nursery and this information is from their catalog. For further information please see Martin's article "Variation in the European Polypodium vulgare complex" in Fern Horticulture: Past, Present and Future Perspectives 1992 Intercept Ltd.

BRITISH SPECIES AND HYBRIDS

The Polypodium vulgare complex in Britain and mainland Europe consists of three species all of which hybridize with each other; we thus have 3 hybrids making a total of 6 taxa, all native to Britain:

Polypodium australe Fee (P. cambricum) - Southern Polypody.

Polypodium vulgare L. - Common Polypody

Polypodium interjectum Shivas - Intermediate Polypody

Polypodium x font-queri Rothm. (P. australe x P. vulgare) Font-Quer's Polypody

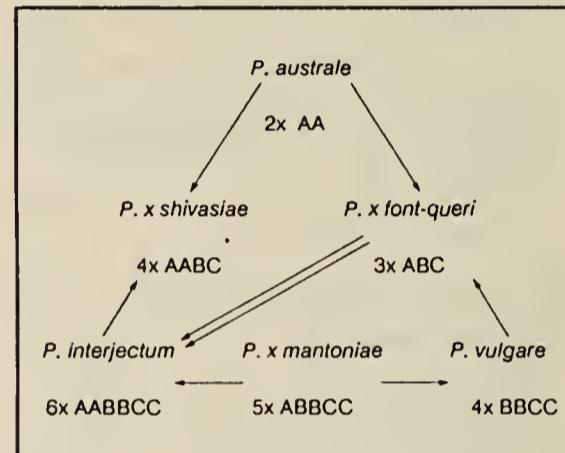
Polypodium x mantoniae Rothm. (P. vulgare x P. interjectum) Manton's Polypody

Polypodium x shivasiae Rothm. (P. australe x P. interjectum) Shivas' Polypody

P. australe grows best with some lime in the substrate

P. interjectum likes a substrate about neutral, while

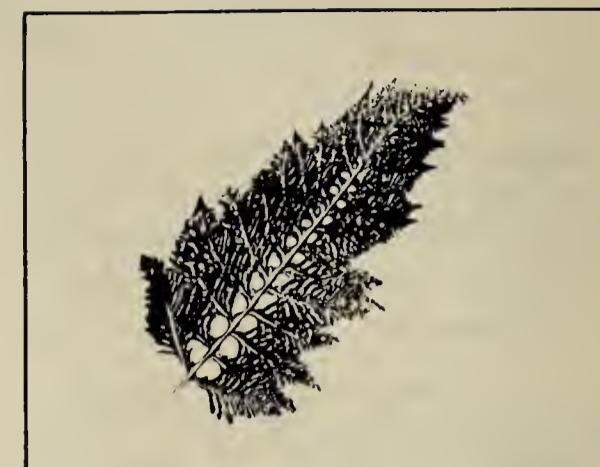
P. vulgare prefers a pH on the acid side of neutral.



Inter-relationships between the six British taxa of the Polypodium vulgare complex.

All 6 taxa are hardy down to temperatures as low as -30 C. All need good drainage but should never dry out; in spring and autumn give a good dressing of leaf mould to which add a little bone meal. Some attention should be given to pH preferences as suggested above; the ideal situation for growing all types together is pH 6.0 to 7.0. P. australe varieties like old mortar rubbish in the mixture.

Sizes given are measured from plants established in our garden at Leinthall Starkes.



P. australe cv. Cambricum - from original Welsh locality, cultivated at Leinthall Starkes.

Cambricum group - Pinnae deeply lacerated, plant always completely sterile. All apparently P. australe cultivars.

'Prestonii' - Yelland, Lancs., 1971, coll. R. Preston. Congested form of 'Cambricum' - usually fairly dwarf? We have a candidate clone which might turn out to be this cultivar, 12x4 inches.

'Barrowii' - Witherslack, Cumbria, 1874, coll. T. Barrow. Pinnae segments long and narrowly pointed, irregularly concave and convex on the same pinna giving frond a spiky appearance, frond triangular, up to 19 x 7 inches. This variety is not common in cultivation, plants labelled 'Barrowii' are often 'Whilharris' in our opinion.

'Whilharris' - Glastonbury, Somerset, 1893, Whilharris. Based on a named specimen in the British Museum herbarium, we believe 'Whilharris' to have pinnae segments long and broadly pointed, irregularly concave and convex, frond lanceolate, 18x 5 inches. Frond texture thicker than in other cambricums. Often in cultivation as 'Barrowi'

'Cambricum' - base form, very similar yet distinct from the original Welsh find, we therefore think this may be a

plant of Irish origin. Sometimes in cultivation as 'Whilharris'



P. australe cv. *Pulcherrimum Addison*.

Pulcherrimum group - all P. australe cultivars.

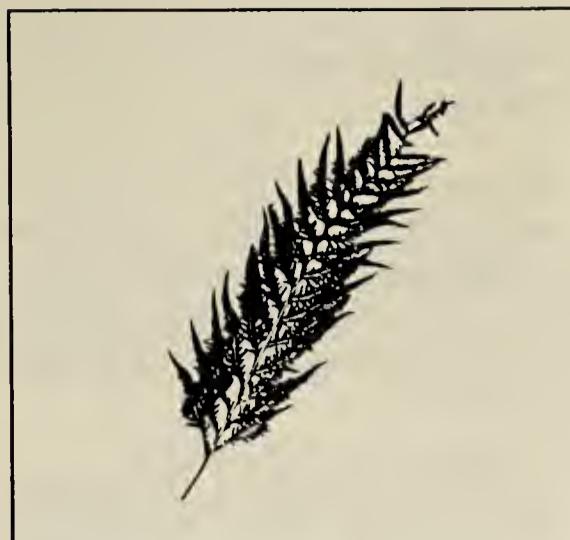
The pulcherrimum variety - literally 'most beautiful' - is aptly named. Fronds regularly and deeply bipinnatifid. It is similar in make to the true 'Cambricum' but the lamina is of a thicker texture and will always produce some sori when mature. It can be separated from 'Cornubiense' by the lack of any fronds out of character.

'Pulcherrimum Addison' - the first example of this type was found wild on Whitbarrow in Cumbria in 1861 by T. Addison.

'Pulcherrimum May' - apparently raised by the nurseryman, May of Edmonton in London, similar to 'Pulcherrimum Addison' but a darker green.

'Pulchritudine' - raised by E.J.Lowe in 1884. A dense form with concave fronds. Plants we offer may be this cultivar or 'Pulcherrimum Perry'.

'Omnilacerum group' - all P. australe cultivars.

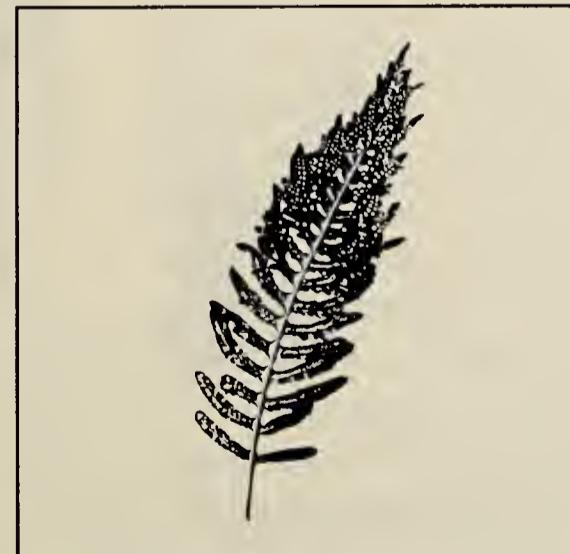


P. australe cv. *Omnilacerum Oxford*.

Plants fertile. Fronds erect, narrowly ovate-triangular up to 25 inches tall. Pinnae irregularly cut almost to the midrib (lacerated) throughout length of frond, lacerations longest at mid-point of pinna. Texture thick, as in typical P. australe. Possibly the tallest form of European polypody.

'Omnilacerum Oxford' - Tregony, Cornwall, pre 1897, probably coll. by J.S. Tyerman, became well known after its rediscovery in the Oxford Botanic Gardens, up to 25 x 7 inches. Now grown as 'Omnilacerum' or 'Oxford Superbum'.

Semilacerum group - all P. australe cultivars.



P. australe cv. *Semilacerum Falcatum O'Kelly*.

Plants fertile in all forms. Fronds ovate-triangular or ovate-lanceolate, up to 18 inches tall. Pinnae irregularly lacerated, along up to half of frond, usually the basal half. 'Semilacerum Falcatum O'Kelly' is an exception with lacerations more prominent towards the tip of the frond. For good character expression good cultural conditions are essential. Sometimes called the 'Irish Polypody'.

'Semilacerum Robustum' - Whitbarrow, Westmorland, 1863, coll. J. M. Barnes. 'Semilacerum Crispatum', 'Semilacerum Undulatum' or 'Semilacerum Bolton' are all perhaps the same form, or very similar. Further work is needed here. A handsome and robust plant. Dark green, tall - 21 x 6 inches, pinnae undulate or crisped.

'Semilacerum Falcatum O'Kelly' - West Ireland, coll. O'Kelly, c. 1910. Narrow form with falcate pinnae, i.e. pinnae curved towards the tip of the frond. Very distinct. 17 x 5 inches. The curving fronds produced by a clump of this cultivar make a magnificent sight.

'Semilacerum Lowe'i' (Jubilee) - Ireland, coll. Col. Lowe, nineteenth century. Imbricate form, lobes broad and acutely pointed, 15 x 8 inches. The plant in cultivation does not agree with descriptions of the Victorian plant, there may therefore be two cultivars involved.

'Semilacerum' - base form, very attractive when well grown. Pinna divisions long and pointed.

(Bipinnatifidum group) - frond deeply bipinnatifid when well grown, a group of cultivars intermediate between 'Semilacerum' and 'Pulcherrimum'.

continued on page 12



P. australe probably *cv. Grandiceps Forster*, but possibly *c. Grandiceps Fox*.

Cristatum group

Plants fertile, rachis or pinnae branched at any point. Texture thick.

P. australe forms:

'Cristatum old form' - Cork, by Perry, 1854. Pinnae twisted into small terminal crests, span of pinnae wider than crest of frond. 19 x 6 inches.

'Grandiceps Fox' - Mrs. Fox, but probably found by Mrs. J. K. Hodgson of Ulverstone, Lancs., 1868. Like 'Forster' but crests larger. Differentiation between Fox and Forster is uncertain today but we now favor the view that the plant in cultivation as 'Grandiceps Forster' is in fact this form.

'Trippitt's Crested' - Raised by Bob Trippitt about 1975. An exciting new break, it is really a percristate form, hitherto not described in polypodium. It is in effect a crested form of 'Pulcherrimum' with falcate pinnae (i.e. pinnae curved towards frond tip).

P. interjectum (some may be the hybrid *P. x mantoniae*) forms:

'Glomeratum' - Dorset, J. Mullins,

1873. No two fronds alike. Fronds and pinnae branching irregularly. 12 x 6 inches.

'Bifido-grandiceps' (Intermediate) or sometimes called 'Bifido-multifidum' or 'Bifido-cristatum' - origin obscure. Crest at head of frond broader than frond, pinnae crests bi- or tri-fid. 20 x 4.5 inches.

'Ramosum Hillman' - Hampshire, coll. C. Hillman, 1860. Frond branches repeatedly at base and again at frond tips producing small multifid crests. Pinnae not usually crested. 14 x 14 inches, yes, often as wide as it is tall!

P. vulgare forms:

'Bifido-grandiceps' (Common) - or sometimes called 'Bifido-multifidum' or 'Bifido-cristatum' - Probably found at Grange, Cumbria, by Walmsley, 1867. 20 x 2.5 inches. Not normally distinguished from the P. interjectum form but here the frond is narrower, and typical P. vulgare apart from the flat dichotomous crests.

Cornubiense group

Plants fertile, or at least soriferous. Fronds ovate-lanceolate, usually tripinnatifid, quadripinnatifid, and

normal (simply pinnate), all mixed on the same plant and sometimes on the same frond, up to 18 inches. Tripinnatifid fronds almost identical to 'Pulcherrimum' but darker green. Unless normal fronds or part-fronds have been cut off, their presence is diagnostic. Texture thick.

P. interjectum (or ? P. x mantoniae) forms:

'Cornubiense' - the 'Common law Cornubiense' as known in trade today - the coarse tripinnatifid type. This may be 'Cornubiense Foliosum' of Clapham, or 'Fowleri', or 'Cornubiense Stableri', if it could be established to be any of these cultivars it would be very satisfactory to be able to substitute the old name. A good sturdy garden plant 18 x 8 inches.

'Cornubiense Bifidum' - origin obscure, bifid form of 'Common law Cornubiense', probably a P. s. mantoniae form. 15 x 6 inches.

P. vulgare forms:

'Elegantissimum', 'Cornubiense' or 'Whytei' - Cornwall, Rev. Whyte, 1867. Quadripinnatifid, tripinnatifid and normal fronds, 15 x 7 inches.

'Trichomanoides 'Backhouse' - raised before 1873 from 'Elegantissimum' by Backhouse. Quadripinnatifid and normal fronds only, 15 x 6 inches. Raised from 'Elegantissimum'.

'Cornubiense Grandiceps', 'Claphamii' or 'Multifido-elegantissimum' - crested form of 'Common law Cornubiense' 15 x 4 inches, hybrid raised by Clapham from (probably) P. vulgare 'Bifido-multifidum' and P. vulgare 'Elegantissimum'. This cultivar has no quadripinnatifid fronds.



P. interjectum (or ? *P. x mantoniae*) *cv. Cornubiense*. - 'common law' form showing reversion to normal.

Other forms - This group includes all forms of British polypod excluded from the previous groups. Texture thick. Fertile, or at least frond soriferous.

Polypodium interjectum - forms:

'Serratum' - pinnae margins broadly toothed, frond lanceolate 15 x 4 inches.

'Crenatum' - pinnae roundly lobed. Buckfast, Devon, c. 1980, 24 x 7 inches. Found in company with a P. australe semilacerum form and may be the hybrid (P. x shivasiae).

P. australe - forms:

'Macrostachyon' - Co. Clare, Ireland, c. 1890, coll. P. B. O'Kelly, frond broad and regular except for long caudate terminal lobe, 12 x 5 inches.

'Hornet' - North Wales, 1983. Each pinnae and frond tip truncate with the midrib protruding to form a horn, 8 x 2 inches.

Martin concludes his article in "Variation in the European Polypodium Vulgare Complex with the observation,

"Most of the best cultivars in the European complex are forms of P. australe, with a few in P. vulgare. Cultivars of P. interjectum (or P. x mantoniae) are usually more coarse but grow relatively rapidly and are therefore the forms most commonly seen. Fortunately, most of the more select cultivars of P. australe and P. vulgare have survived since the heyday of fern culture.

Some enthusiasts have demonstrated that by breeding from the material already in cultivation, improvements on the old Victorian forms are possible. There is, therefore, no reason why many more outstanding forms should not be raised in the future. Indeed it may yet prove possible to re-create some of the varieties lost to cultivation. The most exciting single challenge which still remains is to breed a new form of Cambricum."

"It is very pleasant and cheerful nowadays, when the brown and withered leaves strew the ground and almost every plant is fallen, to come upon a patch of Polypody... on some rocky hillside in the woods, where in the midst of dry and rustling leaves, defying frost, it stands so freshly green and full of life" -- Thoreau.



Martin Rickard (Photo by Harry Olsen)

Martin Rickard

Martin first became interested in ferns while pursuing his B.Sc. in 1965. He joined the British Pteridological Society in 1968 and the American Fern Society in the early 1980's. He edited the BPS Bulletin from 1979-83 and has been the editor of Pteridologist from 1984 to the present. He is currently a Vice-President of the BPS as well. In addition he supports his wife's work in their nursery 'Rickards' Hardy Ferns Ltd' and their plants have won several medals at various shows including the Chelsea Flower Show. Martin writes that his fern interests include "fern books, fern growing, hardy ferns especially polypodiums and exotic species but also tree ferns. Keen on fern geography especially in the British Isles."

Lady Fern and Male Fern - What's in a Name

A. R. KRUCKEBERG, "GENERAL-PURPOSE BOTANIST"

When your editor, Sue Olsen, asked me to do some sleuthing on the botanical names of the lady fern and male fern, I had no idea it would take me off into the arcane realms of ancient folklore. But first let me attend to the matter of the Latin names for these ferns. Sue wanted to know: "Who put the 'e' in *filix*? Both the lady fern, *Athyrium filix-femina*, and the male fern, *Dryopteris filix-mas* contain in the species epithet, the prefix *filix*. Sue goes on: "I'm amazed at the number of people and institutions, who should know better, who write about *Athyrium felix femina* and/or *Dryopteris felix-mas*". The obvious error is the substitution of the "e" for "i" in *filix*. The correct spelling is, of course, *filix*, the Latin word for fern. Whereas, with wrongly spelt *felix*, we get the Latin for "happy" or "lucky". So be "felix" in using *filix*!

Now for the fascinating folklore behind the common names. Why "lady fern" and "male fern"? I consulted two fern experts, Drs. Warren H. Wagner Jr. and Cathy Paris, who provided me with some intriguing folk-history.

The matter of gender for these two ferns is fairly clear. The lady fern is graceful, while the male fern is robustly erect. T. C. Frye (of early University of Washington Botany) opines: "The old herbalists of centuries ago had an idea that these two ferns, growing more or less associated in European woods, represented in a way the two sexes. It was not the idea that one fern was female and the other male of the same species. The sex was figurative; just as a ship is now spoken of as feminine."

The more intriguing folk-history is the ancient linkage of the two ferns to their occult powers. In ancient times, lady fern was supposed to bear the "mystic fern seed", so valued for its reputed power to make its possessor invisible. In ancient days it was not the lady fern, but female fern. Only later in the courtly 18th century and the prim Victorian 19th century did female fern become lady fern. The 'seed' of male fern was reputed to have the same power - of rendering people - or beasts - invisible. The 'seed' (spores) being invisible, it bestowed invisibility. Fugitives or hunted animals disappearing among ferns vanished because fern 'seed' fell on them. 'Seed' of the thickest and tallest ferns had such power.

As one might expect, both ferns had an honored place in the folk medicine-chest of yore. The Fern Herbal by Elfriede Abbe (Cornell U. Press) can take you into these intriguing by-ways.



The Uses of Botany

There should be no monotony

In studying your botany

It helps to train and spur the brain

Unless you haven't got any.

It teaches you — does botany

To know the plants and spot any

And learn just why they live or die

In case you plant or pot any.

You learn from reading botany

Of woolly plants and cottony,

*That grow on earth and what they're
worth*

And why some spots have not any.

You sketch the plants in botany.

You learn to chart and plot any,

Like corn or oats, you jot down notes

If you know how to jot any.

Your time, if you'll allot any

Will teach you how and what any

Odd plant or tree can do or be

And that's the use of botany!!

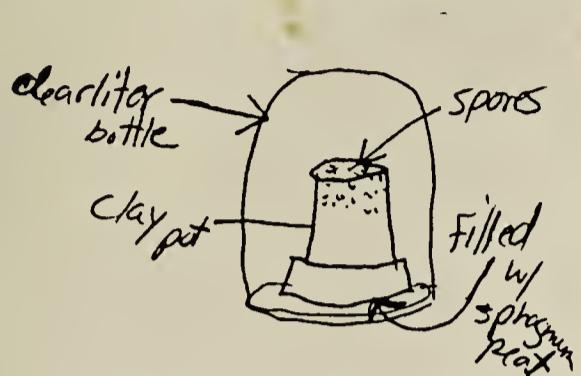
Berton Braley

Science Newsletter

Mar. 9, 1929

Starting Ferns From Spores on Clay Pots

SANDI O'BRIEN, LOCKPORT, IL



In my propagation technique, I boil clay pots to sterilize them, then fill them with sphagnum peat and place on a dish of water (to keep moist). I place this under a bell jar created from the bottom of a liter bottle with the top cut off. The spores are sprinkled on the top and sides of the clay pot. When I start seeing fern fronds forming, I use tweezers to lift off the tiny plants and transfer them to small pots of soil. (I sort of lay them on top, but push them into the soil a little bit.) There is no problem getting them off the pot - they are sturdy and lift right off. I wait until fern fronds form before I remove the plants from the pot. I then keep the transplanted pots under a clear cover for several weeks to keep things humid, gradually removing the cover to toughen them up.

Happy Holidays

The officers & board members of
The Hardy Fern Foundation extend
best wishes for the Holiday Season
and a prosperous 1994 to you all.

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<input type="checkbox"/> Contributing	100.00
<input type="checkbox"/> Supporting	500.00
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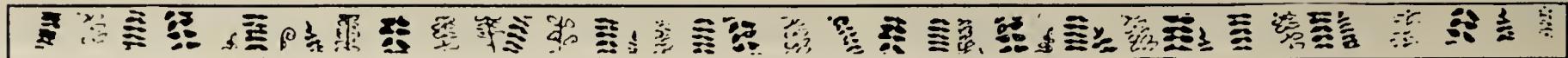
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The Hardy Fern Foundation:

P.O. Box 166

Medina, Washington 98039-0166

A non-profit organization. Your membership payment & contributions are tax deductible.



Free Admission to the Northwest Flower and Garden Show

Once again the Hardy Fern Foundation will have a booth at this premier garden event which will run from Feb. 9 to 13, 1994 at the Convention Center in downtown Seattle. The theme of this year's show is "Water, Water Everywhere" and it guarantees to bring a bit of spring into our dreary February. As in the past there will be major displays, booths with garden items for sale and a full slate of lectures on all aspects of gardening. Rosemary Verey of England will once again be the headliner of the seminar series. Our Hardy Fern Foundation booth must be manned at all times so we are counting on your volunteer help. By working one shift you will be granted free admission to the show. Please call Anne Holt at 842-4108 and let her know when you'd like to join us.

Mexican Fern Project Needs Your Help!

Dr. John Mickel, Curator of Ferns at the New York Botanical Garden and a Scientific Advisor to the Hardy Fern Foundation has devoted over 36 years to the study of Mexican ferns and published three books on the subject, Liebmann's Mexican Ferns, Pteridophyte Flora of Oaxaca, Mexico and Pteridophytes of Nueva Galicia. Now in collaboration with Dr. Alan Smith of the University of California-Berkeley, Monica Palacios-Rios of Xalapa, Veracruz and Ivan Valdespino of the New York Botanical Garden it is planned to research the ferns of and publish a book on all of the Mexican pteridophytes. John writes, "The resulting book will include keys, descriptions, synonyms, comments, distribution maps, and illustrations of all the species of ferns and fern allies of Mexico." The proposed budget for the project is \$130,000, and John is actively seeking donations. Any amount will be gratefully received and those donating \$30. or more per year will automatically become part of an informal organization, Friends of the Mexican Fern Flora and receive a semiannual newsletter with progress reports on the project. Your tax deductible checks should be made payable to the New York Botanical Garden and sent to Dr. John Mickel, New York Botanical Garden, Bronx, N.Y. 10458.

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